c) On a $0 \leq u_n - 1 \leq \frac{1}{2^{n+1}} \quad \forall n \in \mathbb{N}$

et $\lim\limits_{n \to +\infty} \frac{1}{2^{n+1}} = 0$ car $2 > 1$

$2^{n+1} \to +\infty$

Donc $\lim\limits_{n \to +\infty} u_n - 1 = 0$

Ainsi $\boxed{\lim\limits_{n \to +\infty} u_n = 1}$